REMARKS

Status of the Claims

Claims 1 and 4-8 are pending in the present application. Claims 4 and 5 are withdrawn as directed to a non-elected invention. Claim 1 is amended. Support for the amendment to claim 1 is found, for example, in claim 3, now canceled, pages 4-5, bridging paragraph, and pages 8-11 in the originally filed application. Claim 2 is also canceled. No new matter is entered by way of this amendment. Reconsideration is respectfully requested.

Issues under 35 U.S.C. § 103(a)

In the February 22, 2010, Final Office Action, claims 1-3 and 6-8 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over U.S. Patent No. 6,555,361 to Lyman *et al.*, ("Lyman"), Suzuki *et al.*, *Brain Research Protocols*, 1999, 4:29-35, ("Suzuki"), Morel *et al.*, In situ Hybridization in electron microscopy, 2001, CRC Press, Boca Raton, Section 6.9: "Hybridization", pages 1-2 and 239-243, ("Morel"), and U.S. Publication No. 2002/0127589 to Sato *et al.*, ("Sato"), *see* Office Action, pages 3-8. This rejection is respectfully traversed.

According to the Examiner, Lyman and Suzuki teach all of the elements of the independent claim 1 except for a vessel solution and a sample solution with the same vapor pressure. However, the Examiner believes that Morel remedies this deficiency. The Examiner states that Morel describes a hybridization method comprising a sample solution that is essentially the same as the vessel solution. According to the Examiner, the sample solution of Morel is 4X SSC and the vessel solution is 5X SSC. The Examiner further alleges that an ordinary artisan could have modified the vapor pressure solutions of Morel to achieve the same vapor pressure solutions described in the instant claims since such modification is routine experimentation. The Examiner also alleges that an ordinary artisan would have recognized that the vessel and sample solutions of Morel have the same properties as the solutions described in the instant claims.

Sato is cited for describing the elements in dependent claims 2 and 3. Specifically, the Examiner states that Sato teaches a hybridization microarray comprising a hydrophilic region to

which probe biopolymers are fixed and a hydrophobic region to which no probe biopolymer is immobilized, which is formed around the arranged plurality of hydrophobic regions, *see also* Office Action of July 22, 2009.

The Instant Invention

Claim 1, as amended is directed to a hybridization method comprising simultaneously hybridizing multiple specimens using a microarray, wherein said microarray is formed by arranging, on a glass slide, a plurality of hydrophilic regions, wherein a hydrophobic region is formed around the arranged plurality of hydrophilic regions on the glass slide, and wherein a plurality of probe biopolymers are spotted and immobilized to the plurality of hydrophilic regions and wherein no probe biopolymer is immobilized to the hydrophobic region, wherein said hybridization step further comprises hybridizing a sample biopolymer and the probe biopolymers in a closed vessel containing a solution having the same vapor pressure as a solution containing the sample biopolymer, wherein the solution containing the sample biopolymer is in contact with the hydrophilic regions on the glass slide.

The subject matter of the instant claims was allowed by the Japanese Patent Office

Applicants note that amended claim 1, which describes the same subject matter as the claims in the corresponding Japanese application, was allowed. Applicants submit this information as persuasive authority that the amended claims are not anticipated or obvious in view of the prior art.

The cited references do not teach or suggest all of the elements of the claimed methods

Applicants submit that none of the cited references, either alone or in combination, teach or suggest all of the elements of amended independent claim 1. In particular, none of the cited references teach methods comprising simultaneously hybridizing multiple specimens using the described microarray and the closed vessel containing a solution having the same vapor pressure as the solution containing the sample biopolymer.

Advantages of the claimed method

Further, the claimed methods result in advantages that could not have been expected from the cited references by an ordinary artisan. Applicants submit that conventional hybridization requires the use of a glass coverslip to form a gap between a glass slide and a substrate, so as to avoid leakage of a sample solution to the outside of the glass slide, or to avoid variation in the amount of the sample solution in a particular region of an array, *see* page 2 of the originally filed application. Moreover, Applicants submit that conventional hybridization chambers or vessels, which receive a solution on a glass slide, are used for the same purpose as a coverslip in conventional hybridization.

When coverslips and conventional vessels are not used in conventional hybridization methods, variation in the amount of the sample solution is very likely. Therefore, in conventional hybridization, the amount of sample solution is controlled by the coverslips and vessels. In contrast, the amount of sample solution in the claimed methods can be accurately controlled by carrying out hybridization in a closed chamber containing a solution having the same vapor pressure as the sample solution. That is, glass coverslips or conventional vessels are not used with the claimed methods. This allows for simple and reliable hybridization, *see* pages 4-5, bridging paragraph, of the originally filed application. Moreover, simultaneous multi-specimen hybridization can be readily and reliably performed with the claimed methods. Treatment time for a large number of sample biopolymers, the number of necessary microarrays, and the amount of required agents are also remarkably reduced.

The instantly claimed hybridization method, which comprises simultaneously hybridizing multi-specimens, is performed on a single glass slide. Commonly, a glass slide of around 25 to 26 mm x 75 to 77 is used. Applicants submit that it is difficult to handle such a glass slide using conventional hybridization techniques. Small coverslips are required in conventional hybridization for use with a plurality of structures, each for hybridization of a single specimen. These small coverslips are difficult to handle. As noted above, the claimed invention does not require glass coverslips. Instead, it is only necessary to drop a solution containing a sample biopolymer onto a glass slide resulting in easy handling.

Further, for conventional multi-specimen hybridization, numerous vessels may be required, each for hybridization of a single specimen, *see* description of conventional vessels or hybridization chambers, on pages 2-3, bridging paragraph, in the originally filed application.

Moreover, humidifying means should also be provided. In view of these requirements, fewer specimens may be handled per unit space when using conventional hybridization methods. In contrast, the claimed methods use a single vessel larger than a glass slide. Accordingly, simultaneous hybridization of specimens, greater in number than those in conventional hybridization, may be used with the claimed methods.

Applicants further submit that, even if multi-specimen hybridization is conventionally carried out by injecting a solution having the same vapor pressure as the solution containing the sample biopolymer into a conventional hybridization chamber, each specimen is placed into a closed environment, which is different for each specimen. In contrast, since the claimed method allows for multi-specimen hybridization in a single closed environment, simultaneous multi-specimen hybridization may be performed under uniform conditions. In view of the foregoing, the claimed method noticeably results in less variable data, and the hybridizations are accurate and highly reproducible.

As noted above, the advantages of the claimed method could not have been expected from the cited references. For example, the Examiner cites Sato for allegedly disclosing a hybridization microarray comprising a hydrophilic region to which probe biopolymers are fixed and a hydrophobic region to which no probe biopolymer is immobilized, which is formed around the arranged plurality of hydrophobic regions. Nevertheless, the Sato microarray cannot be modified to simultaneously hybridize multiple specimens without the use of a glass coverslip, which is not required in the claimed invention.

Sato discloses a microarray having on its surface a hydrophilic region where a probe biopolymer is fixed and a hydrophobic region where a probe biopolymer is not fixed around the hydrophilic region, *see* claim 1 of Sato. Sato further teaches that while dropping and spotting a solution containing a probe biopolymer on a glass slide, the region to which the probe biopolymer should be spotted is made hydrophilic and the region around the same is hydrophobic to prevent the probe biopolymers between the spots from mixing with each other, and to achieve a desired shape of the spot, (for example a circular shape) *see* for example, paragraphs [0009] to [0011] of Sato. This methodology is also clear from paragraph [0020] of Sato, which states "therefore, when a solution containing the probe DNA is dropped by a spotter 5, the solution spreads in the hydrophilic region 3 while being prevented from further spreading by the hydrophobic region 4."

The Sato microarray is structured to form a spot for a single probe biopolymer in a single hydrophobic region. The hydrophilic region, accordingly, is of a very small size because the hydrophilic region is designed for a spot formed from a single probe biopolymer. Such a microarray is not large enough for a single hydrophilic region to hold a solution containing a sample biopolymer. Accordingly, the Sato microarray requires that the solution containing the sample biopolymer be dropped in such as manner so as to spread the sample biopolymer over the entire glass slide, which includes the spots, and then to subsequently cover the glass slide with glass coverslip. Namely, Sato is a conventional method of hybridization as discussed above, and cannot be used for simultaneous multi-specimen hybridization according to the claimed invention. Accordingly, Sato does not teach or suggest the claimed hybridization method and the advantages of the claimed invention could not have been expected by an ordinary artisan from Sato.

Based upon the above, Applicants submit that the claims are not rendered obvious by the cited references. Withdrawal of the rejection is respectfully requested.

CONCLUSION

In view of the above amendment and remarks, Applicants believe the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Linda T. Parker, Ph.D., Registration No. 46,046 at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,

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